

UNIVERSITY COLLEGE LONDON
DEPARTMENT OF PHYSICS AND ASTRONOMY

File B - Letters to Mr. Keck.

With Compliments

A handwritten signature in dark ink, appearing to be 'M. D.' with a flourish.

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Mr. Robert L. Keuch
Special Counsel
The Attorney General's Office
Justice Department
Washington, DC
USA

Justice Department Investigation of
the Assassination of President
John F. Kennedy--Acoustics Analysis

Dear Mr. Keuch,

It is my understanding that the Justice Department is engaged in a new study of the acoustics evidence originally examined by the House Select Committee on Assassinations (HSCA). This letter contains a recommendation which I hope will be forwarded to the acoustics experts whom you have asked to make this study.

Speaking as a scientist myself, with a background of nearly 20 years of study, research, and teaching in the fields of physics and astronomy, I must comment that the original analysis, although obviously preliminary, was a highly convincing piece of scientific detective work. However, I believe that there was a serious logical flaw in the original acoustics report by Barger et al. (HSCA VIII, p. 33) which ought to be corrected in the detailed analysis performed under Justice Department auspices in order not to bias the results unfairly.

It is my firm opinion that the sound impulse at channel time 140.32 seconds (Table II, VIII, p. 101) was unjustifiably rejected from further consideration as a possible gunshot. The impulse was rejected as a "false alarm" because "... [the] rifle cannot be fired that rapidly" (VIII, p. 105). This is incorrect reasoning, as there is no objective data to indicate how many rifles were actually in the Texas School Book Depository (TSBD) on November 22, 1963. One was found; there may have been another.

Out of personal and scientific interest I have made a careful study of eye-witness testimony, the Zapruder film (from various published versions), and the acoustics reports. I believe there is very strong evidence which suggests that the impulse in question actually represents a gunshot; this evidence is summarized below.

1) The first two shots were fired only 1.66 seconds apart. This is the minimum

without aiming, according to tests made by the HSCA. There is general agreement that the first shot probably missed; it seems totally illogical to expect the assassin to have then rushed the next shot. Obviously this means that there is already a strong inference inherent in the acoustics data that two guns were fired from the TSB. (I understand that the possibility of another firing point in a nearby building was not entirely eliminated by the preliminary analysis, but the more careful analysis should resolve this question.)

2) I have analyzed the detailed statements of 72 witnesses, of whom 71 testified or gave detailed sworn affidavits to the Warren Commission. This work differs in scope from that of Green (HSCA VIII, p. 128). These statements could be classified into three groups:

A: Those who described three closely spaced shots (36 witnesses);

B: Those whose testimony corroborates the acoustical analysis by 1) describing the last shot as "double" or a distinct pair, 2) describing four shots with a pause after the first three, 3) providing testimony which totally agrees with the acoustics work (10 witnesses);

C: Those whose testimony is too vague to analyze further (26 witnesses).

Selection of witnesses was severely biased by the way in which the Warren Commission went about its business. One should not read very much into the fact that the numbers in group A are larger than in group B.

The 36 group A witnesses were dominated by those 28 witnesses who recalled a distinctly longer gap between the first two shots. The mean value of the duration of the three shots estimated by those who offered quantitative opinions was 5.8 seconds, with a standard deviation of 1.1 seconds.* The mean value of the ratio R of the pause between shots 1 and 2 to the pause between shots 2 and 3 is $R = 1.55 \pm 0.14$ (standard error). The statistical probability that 28 of the 36 class A witnesses would describe such a specific series of events in this way if there had actually been equal pauses or a longer pause between shots 2 and 3 is much less than 0.1%. The small number of those who described the shots as "equally spaced" is consistent with this low probability.

Forensic psychologists are (or should be) aware of the weaknesses of eye-witnesses.** One such fault is their inability to report intervals of time accurately. Fraisse (1964) quotes three experiments, Langer et al. (1961) published one, and Buckhout et al. (1975) published yet another. All of these

*The Warren Commission Report (p. 117) noted that the time spans given by witnesses in testimony tended to average 5 - 6 seconds, but attributed this to the witnesses' knowledge of published descriptions of the assassination. The alert lawyer will note that the Commission thereby impugned the credibility of its own witnesses. I do not

experiments imply that eyewitness will tend to report times to be about twice as long as those actually elapsed, over a range of true elapsed times from 3.5 seconds to 6 minutes, 15 seconds (see graph).

Therefore one has every reason to suspect that the class A witnesses actually heard the three shots over a span of 3 seconds or slightly less, and that the spacing did in fact have a value of about $R = 1.5$. There is strong support for this in the testimony of Police Chief Curry, who estimated the time span as 5 - 6 seconds, but whose estimates of his speed and position where he heard each shot indicated a total duration of 2.1 - 2.7 seconds (Warren Comm. IV, p. 172). This remarkable testimony has gone un-noticed until now.

3) In the Zapruder film, three events which probably represent the first three shots are seen at frames 191, 224, and 233-4. The first event is a large blur which could be Zapruder's reaction to a shot fired at approximately frame 184. The second event is the President's reaction to a wound incurred after frame 205 and before frame 224, and the third event is Governor Connally's first visible reaction to his injury. The elapsed time for these three events is approximately 2.6 seconds.

If the impulse at 140.32 seconds of channel time is a shot, the ratio R from the acoustical data is exactly 1.50, and the total interval is 2.76 seconds. This agrees extremely well with what the witnesses reported--provided the expected correction of a factor of 2 is applied to allow for their incorrect estimates of the elapsed time. The three rapid shots could also satisfactorily be construed to agree with the Zapruder film, and at the same time eliminate the contentious and troublesome "single-bullet" theory.

I would prefer not to go into detail in this letter about possible reasons why the class A witnesses did not recall the last shot(s), except to note that there are strong indications in testimony of a rapid onset of mass panic, screaming, and a very loud motorcycle "revving up" in Houston Street immediately after the first three shots. One witness, Mrs. Mary Muchmore, had been filming the motorcade and panicked--stopping the camera--when she heard the shots. Although she could not recall doing so, she actually filmed a sequence seconds later which included the head shot (Warren Comm. V, p. 140. Alas, Mrs. Muchmore did not actually testify herself, and her statement does not appear in the 26 volumes of exhibits. Her testimony might have been very useful.)

If view of all the indications that the impulse at 140.32 seconds (channel time) is a gunshot, it is obviously imperative that the acoustics experts should devote some attention to it. This is the basic recommendation which I would like you to convey to these experts.

M. M. Dworetsky
15-aug-1980

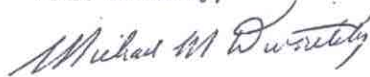
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could serve to supplement the acoustics analysis.

Could you please advise me when you have passed this recommendation on to the scientific experts concerned? Also, I would be grateful if the final report on the Justice Department's investigation could be sent to me when it is ready. If any information is available now, I would of course appreciate receiving it. I sincerely hope that my suggestion does not come too late to be acted upon.

You will, of course, understand that I am rather out of touch with American news here in London, and that this is the reason I am writing to you now rather than earlier. I wish the Justice Department every bit of success possible in finding out what really happened that day.

Yours sincerely,



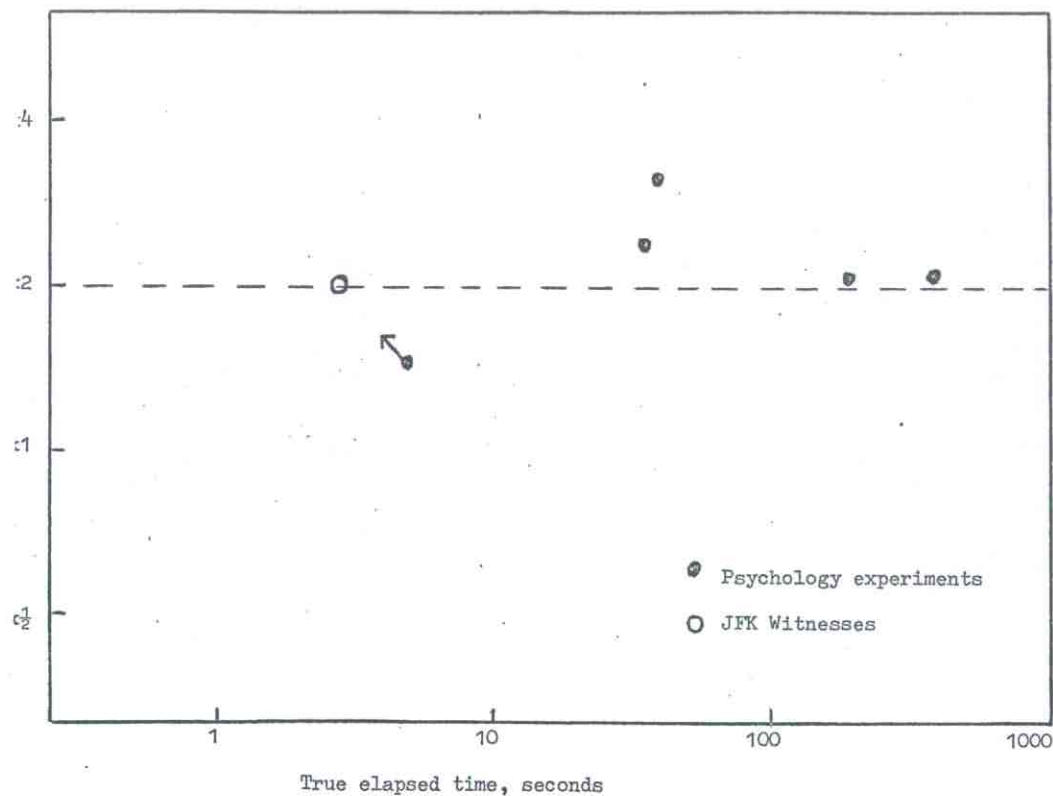
Michael M. Dworetsky

References:

- A. D. Yarmey, The Psychology of Eyewitness Testimony (The Free Press-Macmillan, New York, 1979), pp. 42 - 63.
- P. Fraisse, The Psychology of Time (tr. by J. Leith), (Eyre & Spottiswoode, London, 1964), pp. 227 - 228.
- G. Cooke, ed., The Role of the Forensic Psychologist (Charles C Thomas Publishers, Springfield, Ill., 1980), pp. 175 - 188 (by Buckhout).
- J. Langer, S. Wapner, and H. Werner, Am. J. Psychology 74, 94, 1961.
- R. Buckhout, R. Figueroa, and L. Hoff, J. Psychonomic Soc. 6, 71, 1975.

see also Buckhout's articles in Cooke, op cit., and in Scientific American, December 1974.

M. Dworetzky
-aug-1980



Caption: Results of experiments comparing observers' reported time elapsed with actual time elapsed in five experiments. The point with an arrow represents a "stress" experiment in which increasing subject stress produced responses nearer to the tip of the arrow. The JFK witnesses are also shown if it is assumed that the third impulse at 140.32 seconds (channel time) is the sound of a gunshot.